

# **WHAT IS CLAIMED IS:**

1. A method of making a thermally insulating glass panel, the method comprising:  
depositing a first portion of edge seal material on first and second glass  
substrates;

5 thermally tempering the first and second glass substrates with the first  
portion of edge seal material thereon;

following said tempering, depositing a second portion of edge seal material  
on at least the first substrate over at least part of the first portion of edge seal material  
already on the first substrate;

10 forming a hermetic peripheral or edge seal at least partially between the  
first and second substrates by at least using microwave energy directed toward at least the  
second portion of edge seal material so that the second portion of edge seal material  
bonds to both: a) the first portion of edge seal material on the first substrate, and b) the  
first portion of edge seal material on the second substrate; and

15 evacuating a space between the first and second substrates so as to form a  
low pressure area having a pressure less than atmospheric pressure between the first and  
second substrates.

2. The method of claim 1, wherein said forming a hermetic peripheral or edge seal  
using at least microwave energy is carried out in a manner so that after the hermetic edge  
20 seal has been formed at least certain portions of the first and second substrates retain at  
least about 50% of their original temper strength.

3. The method of claim 2, wherein at least certain portions of the first and second substrates retain at least about 70% of their original temper strength after the hermetic edge seal has been formed.

4. The method of claim 3, wherein at least certain portions of the first and second  
5 substrates retain at least about 80% of their original temper strength after the hermetic edge seal has been formed, and wherein the method further comprises heating the first portion of edge seal material prior to said tempering in order to cause the first portion of edge seal material to bond to said substrates prior to said tempering.

5. The method of claim 1, wherein said forming a hermetic peripheral or edge seal  
10 at least partially between the first and second substrates using microwave energy comprises directing microwave energy having a wavelength of from about 1-10 mm toward an edge seal material in order to form the hermetic edge seal.

6. The method of claim 5, wherein said forming a hermetic peripheral or edge seal at least partially between the first and second substrates using microwave energy  
15 comprises directing microwave energy having a wavelength of from about 2-8 mm toward the edge seal material in order to form the hermetic edge seal.

7. The method of claim 1, wherein said tempering comprises heating said glass substrates with the first portion of edge seal material thereon to a temperature of from about 600-700 degrees C so that at least a portion of edge seal material is at least partially  
20 diffused into one of the substrates during the tempering.

8. The method of claim 1, wherein said forming a hermetic peripheral or edge seal at least partially between the first and second substrates using microwave energy comprises directing microwave energy in the form of a beam toward an edge or peripheral portion of at least one of the substrates to the exclusion of at least a central portion of said at least one substrate in order to form the hermetic edge seal.

9. The method of claim 8, wherein the edge seal is of a material more absorptive to certain wavelengths of microwave energy than is glass of the substrates.

10. The method of claim 1, further comprising providing a plurality of spacers between the first and second substrates, and wherein said first portion of edge seal material comprises solder glass or glass frit.

11. The method of claim 10, further comprising providing a low-E coating or coating system on at least a portion of an interior major surface of at least one of the first and second substrates.

12. A method of making a seal of a thermally insulating glass panel, the method comprising:

thermally tempering a glass substrate with edge seal material thereon;

providing additional edge seal material on said substrate following said tempering, so that the additional edge seal material contacts the edge seal material provided or deposited on the glass substrate prior to said tempering;

providing a plurality of spacers between the tempered glass substrate and

another glass substrate; and

forming a seal located at least partially between the substrates by heating at least the additional edge seal material so that the additional edge seal material fuses with or bonds to the edge seal material deposited on the glass substrate prior to said tempering.

5           13. The method of claim 12, wherein the seal is a solder glass inclusive seal, and where the method further comprises:

evacuating a space between the substrates so as to form a vacuum or low pressure area having a pressure less than atmospheric pressure between the substrates; and

10           wherein said heating comprises using microwave energy to heat both the additional edge seal material and the edge seal material deposited on the glass substrate prior to said tempering so that the additional edge seal material fuses with or bonds to the edge seal material deposited on the glass substrate prior to said tempering.

15           14. The method of claim 12, wherein at least certain portions of the glass substrate retains at least about 70% of its original temper strength after the seal has been formed; and

wherein the edge seal material provided on the glass substrate during said tempering fuses into or with the glass substrate during at least one of: (a) said tempering, or (b) during a separate heating step carried out prior to said tempering.

20           15. A method of making a seal, the method comprising:  
at least partially tempering a first substrate with a first application of seal material thereon; and

following said tempering, adding a second application of seal material and using microwave energy to heat the first and second applications of seal material in order to form a seal at least partially located between the first substrate and a second substrate.

16. The method of claim 15, further comprising:

5           providing a plurality of spacers between the substrates;  
               wherein the seal is a hermetic edge seal; and  
               evacuating a space between the first and second substrates so as to form a vacuum or low pressure area having a pressure less than atmospheric pressure between the first and second substrates.

10           17. A thermally insulating glass unit comprising:

              first and second at least partially tempered glass substrates spaced apart from one another via at least a plurality of spacers;  
               a microwave energy-formed hermetic peripheral or edge seal located at least partially between the first and second substrates, at least a portion of material for  
 15       said peripheral or edge seal having been deposited on at least one of the substrates prior to tempering of the at least one substrate;

              said peripheral or edge seal having been formed in a manner such that at least certain portions of the at least one substrate retain at least about 50% of original temper strength after microwave formation of the peripheral or edge seal; and

a space having a pressure less than atmospheric pressure provided between said substrates and sealed off by said microwave energy-formed hermetic peripheral or edge seal.

18. The unit of claim 17, wherein said microwave energy-formed hermetic peripheral or edge seal comprises a solder glass inclusive peripheral or edge seal.

19. A method of making a seal for a thermally insulated panel, the method comprising:

heating a first substrate with base seal material thereon to a temperature of from about 600-700 degrees C; and

following said heating, applying additional seal material and using microwave energy to re-heat the base seal material and heat the additional seal material in order to form a seal at least partially located between the first substrate and a second substrate.

20. The method of claim 19, wherein the base seal material and the additional seal material both comprise solder glass or glass frit, and the first and second substrates are glass substrates.

21. A method of making a thermally insulating unit, the method comprising:

providing first and second substrates with a plurality of spacers

therebetween; and

forming a hermetic peripheral or edge seal at least partially between the

5 first and second substrates using at least microwave energy.

22. The method of claim 21, further comprising evacuating a space between the first and second substrates.

23. A thermally insulating panel comprising:

first and second spaced apart substrates having a low pressure space therebetween

10 having a pressure less than atmospheric pressure;

a hermetic seal provided between said first and second substrates; and

wherein said seal includes first and second solder glass or glass frit seal portions, at least a portion of said first seal portion having been deposited on said first substrate prior to tempering thereof and said second seal portion having been deposited on one of

15 said substrates following tempering thereof.

24. The thermally insulating panel of claim 23, wherein said seal comprises a peripheral or edge seal, and wherein said seal is formed via at least microwave heating.

25. The thermally insulating panel of claim 23, further comprising a plurality of spacers provided between the substrates.

26. A method of making a seal of a thermally insulating glass panel, the method comprising:

heating a glass substrate with edge seal material thereon;

providing additional edge seal material on said substrate following said

5 heating, so that the additional edge seal material contacts the edge seal material provided or deposited on the glass substrate prior to said heating;

providing a plurality of spacers between the glass substrate and another glass substrate; and

forming a seal located at least partially between the substrates by

10 performing another heating in order to heat at least the additional edge seal material so that the additional edge seal material fuses with or bonds to the edge seal material deposited on the glass substrate prior to said previous heating.